

H.A

Notice of Allowability

Application No.

10/669,179

Examiner

Douglas N. Washburn

Applicant(s)

LARSSON ET AL.

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to communication of 4 February 2004.
2. ☒ The allowed claim(s) is/are 1-8.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☒ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☒ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION
EXAMINER'S AMENDMENT

1 An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr Raymond Coppiellie on 30 March 2005.

Amend the abstract as follows:

A method and apparatus for measuring and evaluating surface irregularities includes illuminating a surface by at least two light sources arranged substantially perpendicular to a reference plane along said surface wherein reflections are detected by a control unit. The control unit extrapolates an imaginary angle of incidence for which no reflection would be detected. A surface slope value is derived using the imaginary angle of incidence and said surface slope value is used to determine a height profile for said surface.

Prior Art Cited

3 Nayar et al. (US 4,988,202) teaches an automated solder joint inspection system for determining the quality of a specular soldered joint through examination of the shape of the joint surface using a series of point light sources and associated highlight reflections from the joint surface. Light is directed toward the solder joint, and reflected in a pattern to an array of light responsive transducers. Utilizing intensity values from the light responsive transducer array, surface orientation of the solder joint at a number of points is determined. The solder joint is evaluated using a rule-based system, through comparison with acceptable solder joint surface features, for an acceptability determination, or alternatively, the surface orientation are used to generate an Extended Gaussian Image of the joint, which are analyzed. Nayar is silent regarding an imaginary angle of incidence for which no reflection would be detected. Further Nayar fails to teach a surface slope value of partial surface in the direction of light sources for acquiring a height profile for surface.

Migdal et al. (US 6,549,288) teaches a system for illuminating an object with a structured light pattern, recording the shape of reflected points of light with a camera. The camera data is processed by a computer system which applies data processing routines to realize 3D surface generation. The light source projects both structured light and uniform illumination light from the same apparent source, and allows for numerical normalization of the images. Migdal is silent regarding an imaginary angle of incidence for which no reflection would be detected and determining a surface slope value of partial surface in the direction of light sources for acquiring a height profile for the surface.

Schmidt et al. (US 6,552,783) teaches an optical system which includes an imaging system and a lighting system. The imaging system utilizes spectral reflectivity to discriminate between components to be inspected and a surface of a printed circuit board on which the components have been placed. The lighting system includes a first light source disposed to project diffuse light along or coaxial with an optic axis of the imaging system and a second light source or sources disposed to project diffuse light from a position which is to the side of the object to be inspected. Schmidt is silent regarding an imaginary angle of incidence for which no reflection would be detected and further fails to teach a surface slope value of partial surface in the direction of light sources for acquiring a height profile for the surface.

Max et al. (US 6,577,404) teaches an arrangement and method for measuring surface irregularities of an object. At least one source of light arranged to illuminate the surface from at least two different positions at a small angle of incidence. A camera arrangement measures shadow formation generated by illumination of the surface microstructure. An evaluator determines surface microstructure from the generated shadow formation by processing an input signal from the camera. Max is silent regarding an imaginary angle of incidence for which no reflection would be detected and fails to teach a surface slope value of partial surface in the direction of light sources for acquiring a height profile for the surface.

Allowable Subject Matter

3 The following is an examiner's statement of reasons for allowance:

Claim 1 recites, in part, "extrapolating for each of said at least one partial surface an imaginary angle of incidence for which no reflection would be detected, said extrapolating being based on said set of reflections and said angle of incidence to said at least one partial surface for each of said at least two sources of light; determining a first surface slope value of said partial surface, said determining being based on said imaginary angle of incidence". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 2-5 depend from claim 1.

Claim 6 recites, in part, "a light sensitive detector arranged to detect said sets of reflections, characterized in that said control unit is adapted for extrapolating, for each partial surface and by means of detected light intensities for each one of the at least two light sources and their associated angles of incidence, an imaginary angle of incidence for which no reflection would be detected, said control unit furthermore being adapted for providing by means of said imaginary angle of incidence a surface slope value (α) of said partial surface in the direction of said sources of light, and for acquiring a height profile for said surface by means of the slope values for the partial surfaces of said surface". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 7 and 8 depend from claim 6.

It is these limitations, which are not found, taught or suggested in the prior art of record, and are recited in the claimed combination that makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas N. Washburn whose telephone number is (571) 272-2284. The examiner can normally be reached on Monday through Thursday 6:30 AM - 4:30 PM.

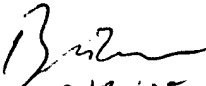
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DNW

BRYAN BUI
PRIMARY EXAMINER


3/30/05